TRACKING TECHNIQUES FOR HOLOGRAPHIC DATA STORAGE MEDIA

This invention was made with Government support under Agreement No. NMA202-97-9-1050 with the National Imagery and Mapping Agency of the United States Department of Defense. The Government has certain rights in this invention.

FIELD

The present invention relates to holographic data storage media.

BACKGROUND

Many different types of data storage media have been developed to store information. Traditional media, for instance, include magnetic media, optical media, and mechanical media to name a few. Increasing data storage density is a paramount goal in the development of new or improved types of data storage media.

In traditional media, individual bits are stored as distinct mechanical, optical, or magnetic changes on the surface of the media. For this reason, medium surface area may pose physical limits on data densities.

Holographic data storage media can offer higher storage densities than traditional media. In a holographic medium, data can be stored throughout the volume of the medium rather than the medium surface. Moreover, data can be superimposed within the same medium volume through a process called shift multiplexing. For these reasons, theoretical holographic storage densities can approach tens of terabits per cubic centimeter.

In holographic data storage media, entire pages of information can be stored as optical interference patterns within a photosensitive optical material. This can be done by intersecting two coherent laser beams within the optical material. The first laser beam, called the object beam, contains the information to be stored; and the second, called the reference beam, interferes with the object beam to create an interference pattern that can be stored in the optical material as a hologram. When the stored hologram is later illuminated with only the reference beam, some of the light of the reference beam is